

Empirical statistical downscaling of seasonal climate forecasts

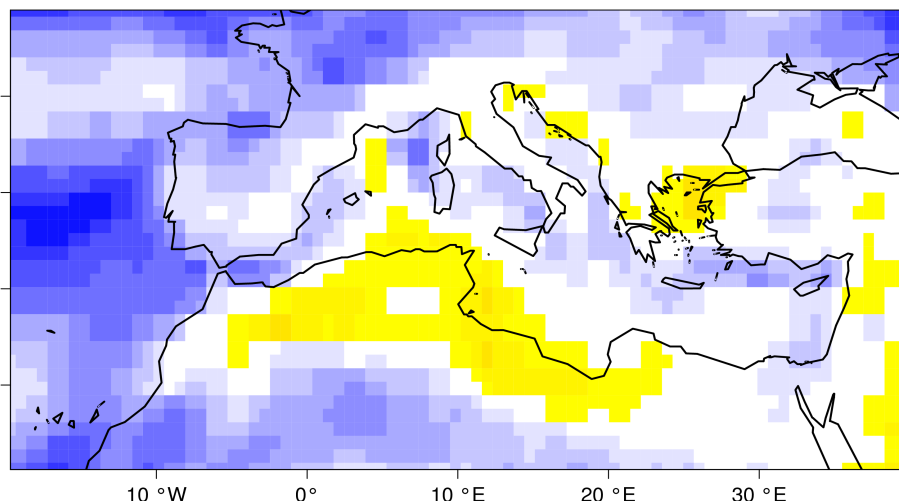
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Climate Forecasting Unit (CFU)

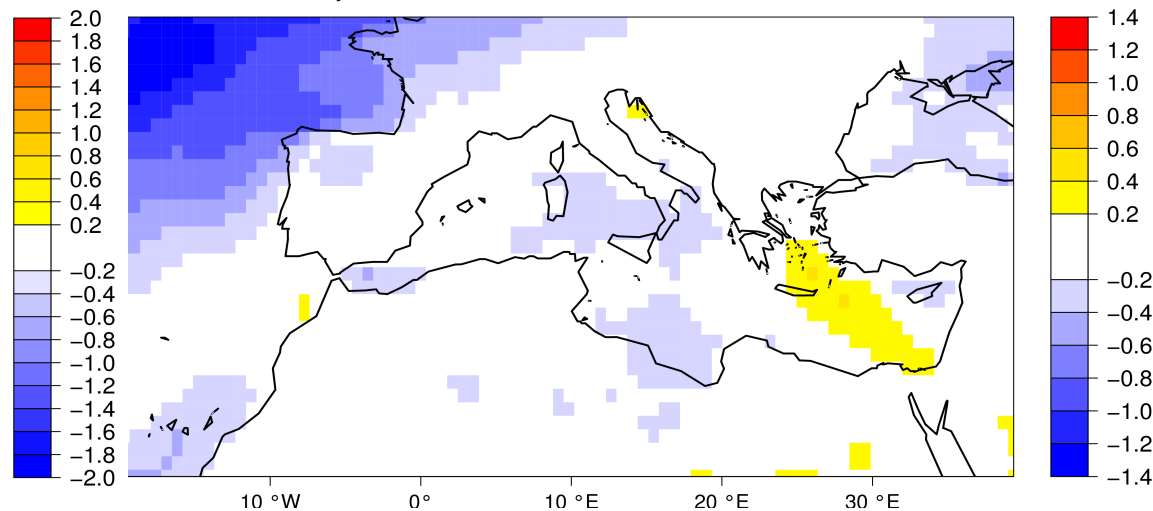
at Institut Català de Ciències del Clima (IC3), Barcelona, Spain

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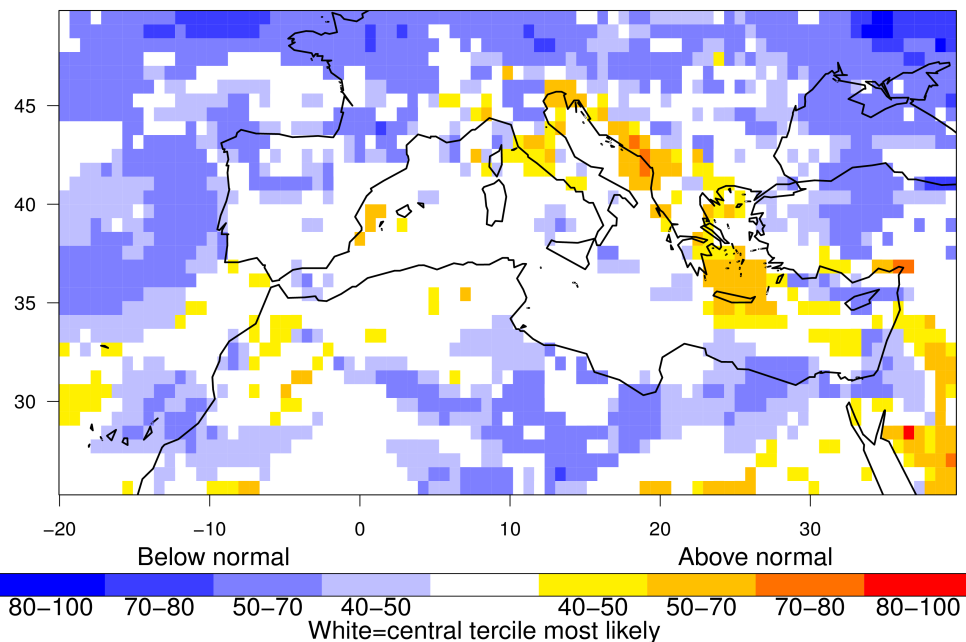
ERAInterim 10-metre wind speed anomaly (m/s) for DJF 2010/2011



Ensemble-mean prediction of 10-metre wind speed anomaly (m/s)
from ECMWF System 4 one-month lead DJF forecasts with start date November 2010



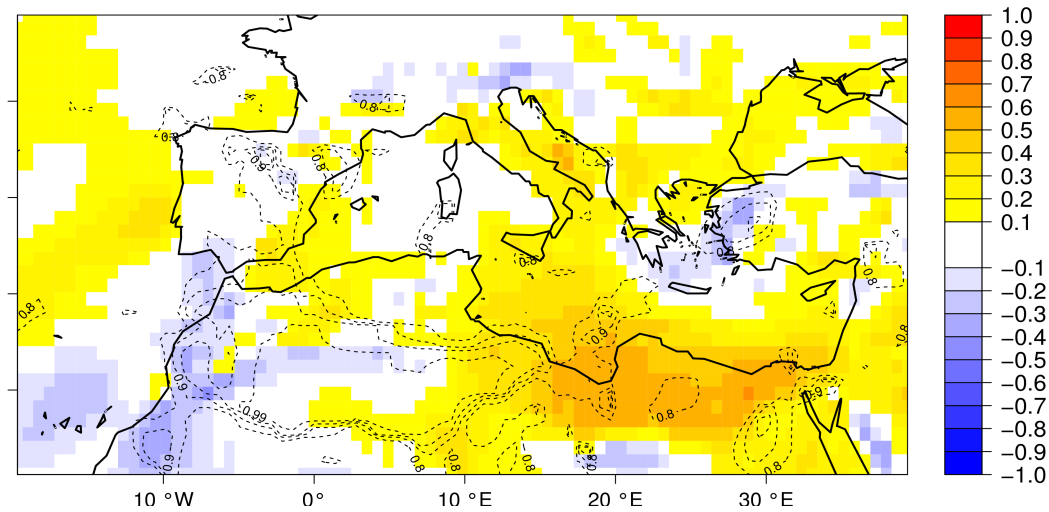
Probability forecast of 10-metre wind speed most likely tercile (%)
from ECMWF System 4 one-month lead DJF forecasts with start date November 2010



DJF 2010/2011 10-metre wind speed anomaly

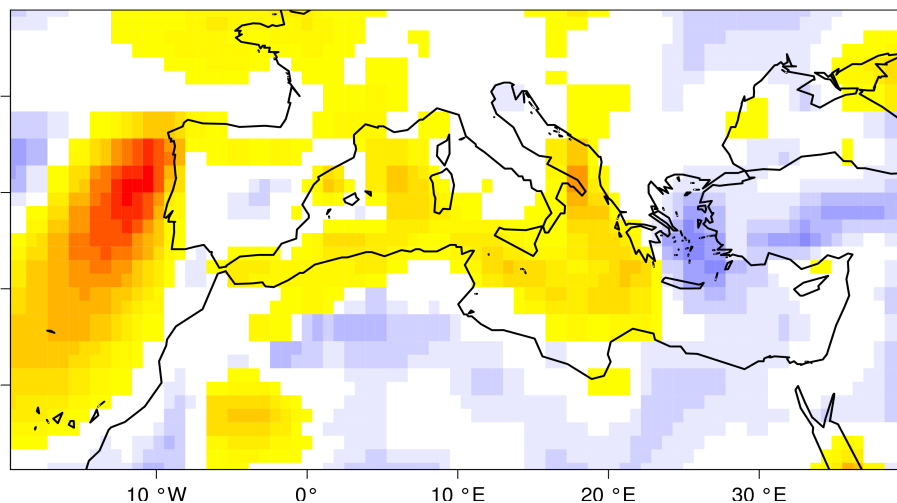
- Observation-based reanalysis
- Ensemble-mean forecast started in Nov
- Probability forecast started in Nov

Ensemble-mean correlation of 10-metre wind speed for ECMWF System 4
one-month lead DJF forecasts with start dates once a year on first of November from 1981 to 2010

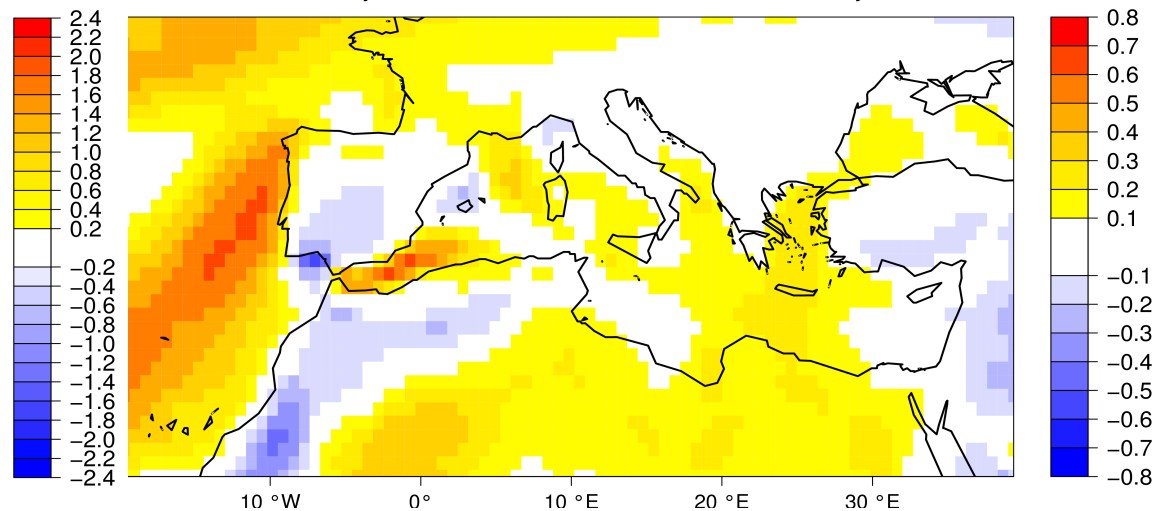


DJF 10-metre wind speed anomaly verification (1991-2010) for Nov started forecasts
Anomaly correlation skill with (1-p) in contours

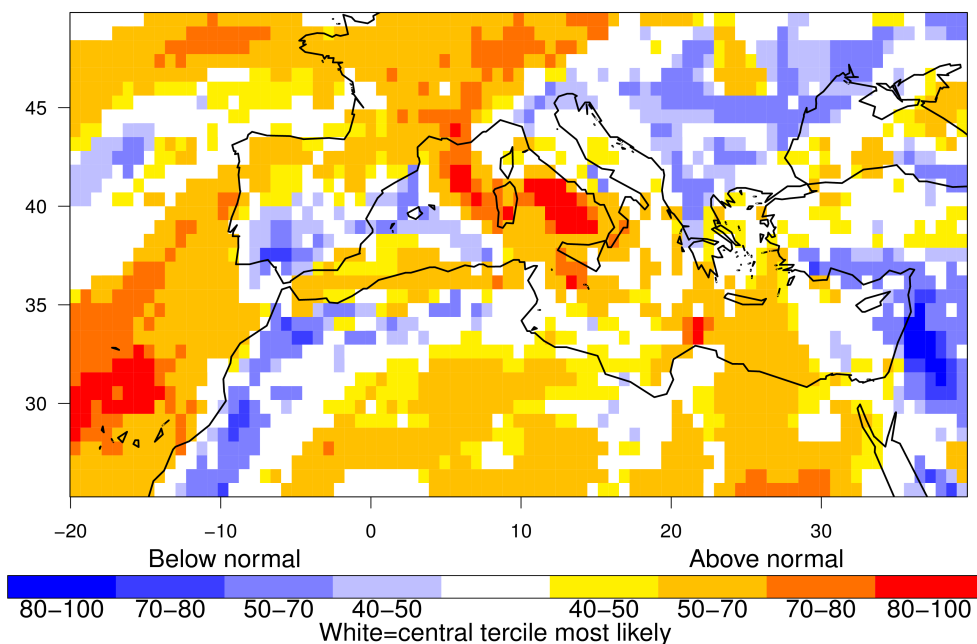
ERAInterim 10-metre wind speed anomaly (m/s) for JJA 2010



Ensemble-mean prediction of 10-metre wind speed anomaly (m/s)
from ECMWF System 4 one-month lead JJA forecasts with start date May 2010



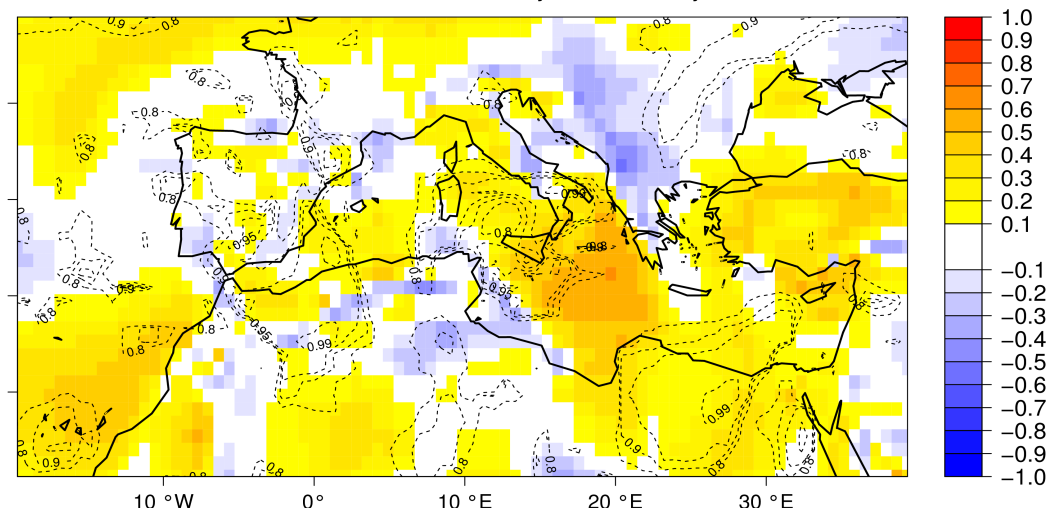
Probability forecast of 10-metre wind speed most likely tercile (%)
from ECMWF System 4 one-month lead JJA forecasts with start date May 2010



JJA 2010 10-metre wind speed anomaly

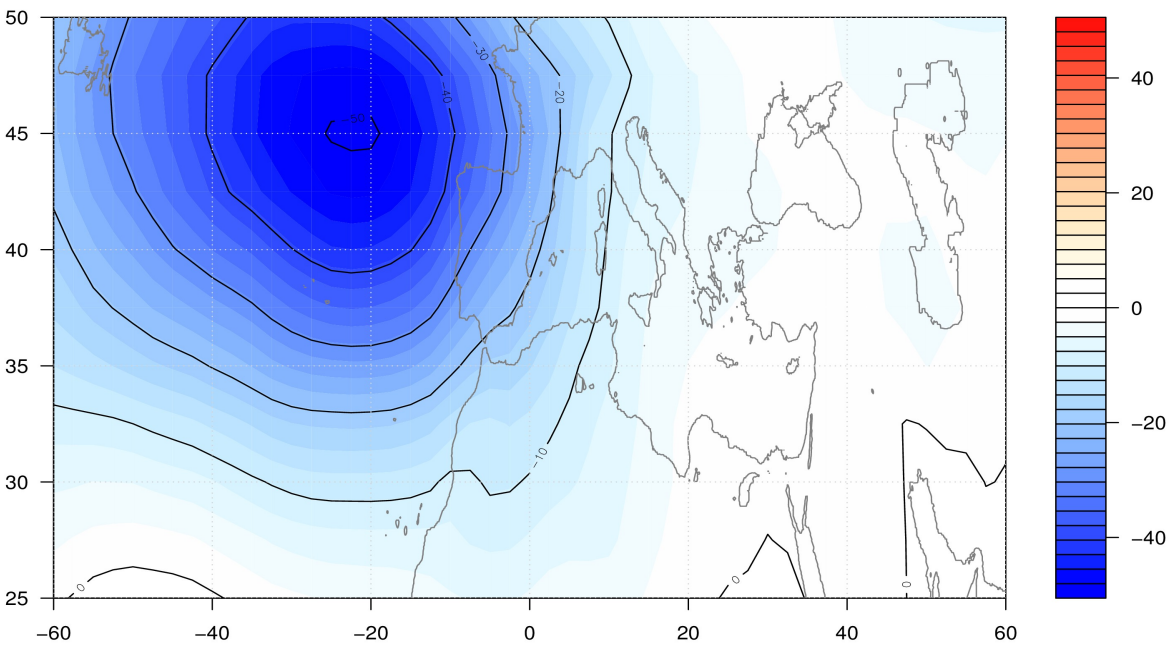
- Observation-based reanalysis
- Ensemble-mean forecast started in May
- Probability forecast started in May

Ensemble-mean correlation of 10-metre wind speed for ECMWF System 4
one-month lead JJA forecasts with start dates once a year on first of May from 1981 to 2010



JJA 10-metre wind speed anomaly verification (1991-2010) for May started forecasts
Anomaly correlation skill with (1-p) in contours

1st EOF for psl

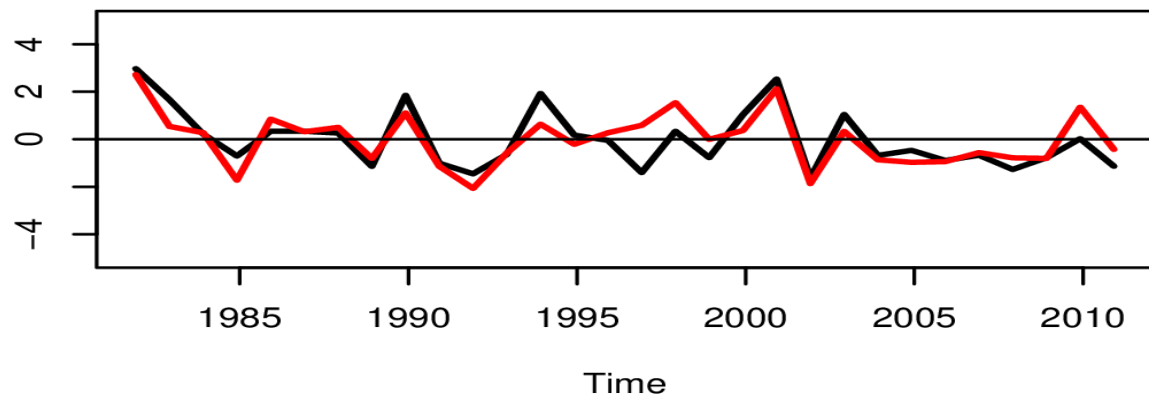


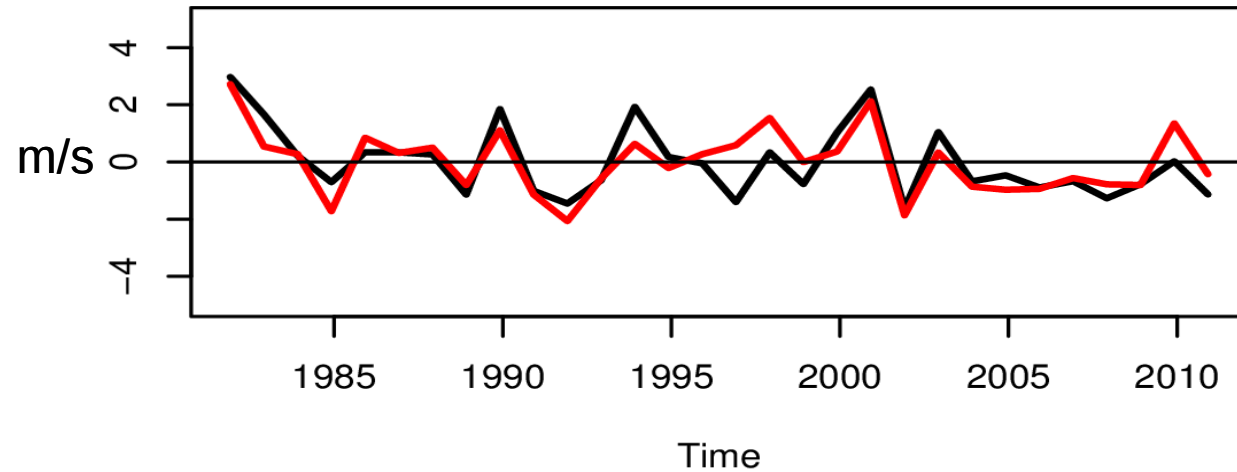
Downscaled 10-metre wind speed anomaly using information on large-scale atmospheric circulation

Leading 4 EOFs of sea level pressure in December

to estimate monthly wind speed at wind farm location in north-west Spain
(red, downscaled estimate; black, observation)

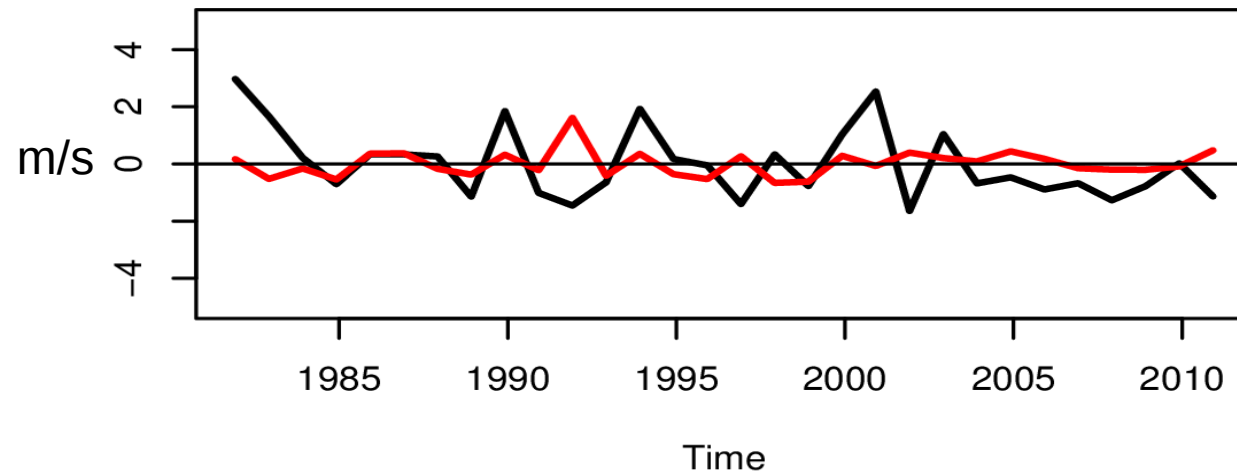
Dec ERAint Cor=0.81





Predictor ERAinterim Dec SLP

cor=0.8



Predictor ECMWF S4 Dec SLP
Nov started forecasts

cor=0

Downscaled 10-metre wind speed anomaly using information on large-scale atmospheric circulation (leading 4 EOFs of Dec sea level pressure anomalies) to estimate monthly wind speed at wind farm location in north-west Spain
(red, downscaled estimate; black, observation)

Preametretu

Erutarepmet

Turetempera

Temperature

Summary

- No skill in seasonal climate forecasts for 10-metre wind speed in north-east Spain**
- Downscaling of Dec 10-metre wind speed in north-eastern Spain using observed sea level pressure close to the observed**
- No skill in downscaled Dec 10-metre wind speed in north-eastern Spain when using sea level pressure from Nov started forecasts**